

# **The Fourth Report of the Infrastructure Maintenance Task Force**

March 2010



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## **Table of Contents**

1. Overview	1
2. Information on Infrastructure Maintenance	1
3. Critical Shortfalls in Infrastructure Maintenance	3
4. Asset Inventories and Management Systems	4
5. Information Technology	7
Members of the Infrastructure Maintenance Task Force	8

## Attachments

Capital Maintenance Schedule: County Government	©1
Capital Maintenance Schedule: Public Schools	©4
Capital Maintenance Schedule: Montgomery College	©6
Capital Maintenance Schedule: M-NCPPC	©9
Operating Maintenance Schedule: County Government	©15
Operating Maintenance Schedule: Public Schools	©16
Operating Maintenance Schedule: Montgomery College	©17
Operating Maintenance Schedule: M-NCPPC	©18

“There are no ribbon cuttings and few, if any, press releases for maintenance and technology; these projects traditionally do not compete well in budget deliberations. Nevertheless, these issues require our continued attention and support.”

Former Councilmember Marilyn J. Praisner  
Initial Chair of the Infrastructure Maintenance Task Force  
March 20, 2006

## **1. Overview**

In March 2005 the Infrastructure Maintenance Task Force (IMTF) issued its first regular report describing the funding necessary to maintain adequately the County agencies' infrastructure, including school buildings, libraries, recreation centers, administrative buildings, roads, sidewalks and hiker-biker trails, garages and lots, ballfields, playgrounds, and other publicly owned facilities. IMTF's second report was published in March 2006, and it noted that future updates would be produced biennially. Its third report was published in March 2008. The Task Force was initially chaired by former Councilmember Marilyn J. Praisner, and has consisted of facilities managers from Montgomery County Government, Montgomery County Public Schools, Montgomery College, and the Maryland-National Capital Park and Planning Commission.

The Task Force's mission is focused on capital programs that rehabilitate infrastructure or replace it in kind, and on operating programs engaged in preventive maintenance—the kind of maintenance that preserves the quality of a capital asset so that it can be functional throughout its useful life. A few examples of such programs are: planned life-cycle asset replacement (PLAR); exterior painting; roof replacement; resurfacing; bridge renovation and rehabilitation; and window caulking. Some types of programs *not* included in this study include: modernizations; interior painting; and litter collection.

The primary objective of the Task Force is to identify the direst needs as candidates for additional funding in the upcoming Capital Improvements Program (CIP) and Operating Budget. It also tracks progress in the development and enhancement of each agency's asset management and inventory systems. Information on both subjects is included in this report.

## **2. Information on Infrastructure Maintenance**

Over the winter months the Task Force met to review updated and expanded information that the members developed for this fourth report. The Task Force generally used the same format as the last report for the CIP tables; the information is arrayed in the tables on ©1-14. The data items are:

- **Capital Project** title (Column A), often broken down to each **Major Element** within it (Column B). For example, the Sidewalk and Infrastructure Revitalization project is on Lines 37 and 38 on ©3, with the sidewalk element on Line 31 and the curb and gutter replacement element on Line 38. Any further clarifications or assumptions are included under **Notes** (Column C).
- **Acceptable Life Span (years)** is not the optimal life span of the asset, but what each agency feels is a tolerable life span—assuming at least some level of regular maintenance—before it has to be replaced or comprehensively rehabilitated. For example, the Department of Transportation (DOT) believes that the acceptable life span for curb and gutter is 30 years (Line 38, Column D).

- **Inventory** is the quantity of the asset in **Units** that are either shown in Columns E and F, respectively. There are an estimated 2,093 miles of curb and gutter on County streets (Columns E and F).
- **How much/many should be replaced annually** is generally the **Inventory** divided by the **Acceptable Life Span**, rounded to the nearest unit. In this example, 70 miles of curb and gutter should be replaced every year (Column G).
- **Average Cost** is the mean cost of replacing/rehabilitating the particular type of infrastructure, in current-year dollars. The mean cost of replacing curb and gutter is \$120,000/mile in Year 2010 dollars (Column H).
- **Acceptable Annual Replacement Cost** is how much money should be budgeted annually to replace/rehabilitate the particular type of infrastructure so that the entire **Inventory** will last over the **Acceptable Life Span**. This is calculated by multiplying the **How much/many should be replaced annually** figure by the **Average Cost** figure. In the case of curb and gutter replacement, 70 miles x \$120,000/mile = \$8,400,000 (Column I). *This is the baseline against which the budget should be compared.*
- **FY10 Approved** is the amount budgeted for FY10—explicitly or implicitly—for this item in the CIP as approved by the Council last May. In this case there was \$6,300,000 programmed to the Sidewalk and Infrastructure Revitalization project for FY10, of which \$3,500,000 implicitly was for curb and gutter replacement (Column J).
- **FY11 Request** is the amount requested for FY11—explicitly or implicitly—for this item in the CIP as recently requested by the agency. In this case the Executive has requested \$6,300,000 for the Sidewalk and Infrastructure Revitalization project in FY11, of which \$3,500,000 implicitly is for curb and gutter replacement (Column K).
- **Future Funding Level** indicates whether the CIP programs the same level as FY11 in each of FYs12-16, or whether it eventually attains a higher or lower level. For curb and gutter replacement a higher level than \$3,500,000 is programmed in at least one later year (Column L).
- **Backlog** is the amount of funds that would need to be programmed in one year to eliminate the backlog immediately. DOT calculates that a one-time expenditure of \$62,790,000 would eliminate the backlog in curb and gutter replacement (Column M).
- **Criticality Rating** is a 1-to-5 rating on an ordinal scale indicating the relative importance of replacing this particular type of infrastructure. The scale is defined as follows:
 

5 = Life safety and systems absolutely necessary to occupy the buildings or very important to the preservation of the facility.

4 = Systems that are very important to the operation of the facility.

- 3 = Systems that do not typically fail to perform suddenly, but are fairly important to operation of the facility.
- 2 = Passive systems that are not vital to the operation of the facility.
- 1 = Systems that are primarily aesthetic in nature or perform a less important function.

Curb and gutter replacement has a Criticality Rating of '3' (Column N).

The Task Force made a special effort to use the same **Acceptable Life Span** and **Criticality Rating** for similar types of infrastructure across agencies. However, the **Average Cost** of these items often differs from one agency to the next, due to the special circumstances of each agency's assets.

The **Acceptable Annual Replacement Cost** could be less than what is displayed in the tables for individual items depending upon how aggressive facilities are otherwise modernized or improved. School and other building modernizations not only provide more core space, but also replace HVAC, roof, and other building systems. On ©5 MCPS has discounted capital construction costs by 25% to avoid such double-counting.

The Operating Budget tables are simpler, noting for each infrastructure element the maintenance activity, the Annual Requirement (the corollary to the Acceptable Annual Replacement Cost in the CIP tables), the FY10 Approved Budget, the FY11 Request, and the Criticality Rating. The information is displayed on ©15-18.

### **3. Critical Shortfalls in Infrastructure Maintenance**

Reviewing these tables, certain types of infrastructure stand out as those in direst need for funding. The following list includes selected examples of capital projects examining the proportional difference between the **FY11 Request** versus the **Acceptable Annual Replacement Cost**, and the **Criticality Rating**. The important caveat here, of course, is that the list is based on those items for which data are available.

<b>Infrastructure Maintenance Element</b>	<b>FY11 Budget Request</b>	<b>Acceptable Annual Repl. Cost</b>	<b>FY11 Request as % of Acceptable Annual Replacement Cost</b>
Co. Govt.: HVAC/Electrical Replacement	\$1,200,000	\$5,750,000	21%
Co. Govt: Roof Replacement: MCG	\$2,000,000	\$4,200,000	48%
Co. Govt.: Life Safety Systems	\$575,000	\$1,003,242	57%
Co. Govt.: Street Tree Preservation	\$250,000	\$5,000,000	5%
MCPS: Fire Safety Equipment	\$753,000	\$1,875,000	40%
MCPS: HVAC Replacement	\$15,000,000	\$25,837,993	58%
MCPS: Energy Management Systems	\$1,570,000	\$1,680,000	48%
MCPS: Roof Replacement	\$6,468,000	\$9,016,139	65%
M-NCPPC: PLAR – Local Parks	\$2,610,000	\$3,281,075	80%
M-NCPPC: PLAR – Non-Local Parks	\$1,465,000	\$2,508,088	58%
M-NCPPC: Trails – Hard Surface Renovation	\$168,000	\$2,284,080	7%



#### **4. Asset Inventories and Management Systems**

The longer-term goal was to initiate an ongoing, regular process to update and improve the inventory and analysis of infrastructure maintenance needs. Each agency's progress on developing asset management systems is described below:

**County Government.** The March 2005 "Report of the Infrastructure Maintenance Task Force" identified the County Government's need for \$1,220,000 to develop a comprehensive asset management data base for both its building and transportation infrastructures. In May 2005, the Council approved \$100,000 for the first phase of development for an inventory and asset management system for the Department of Public Works & Transportation, now the Department of General Services (DGS). DGS used these funds to conduct facility condition assessments within the building infrastructure and to purchase the first module of a maintenance management and inventory control software system for the transportation infrastructure. DGS and the Department of Environmental Protection have continued to partner on their joint use of the competitively awarded Datastream Systems, Inc. contract to further the development of their respective infrastructure inventories and management systems development.

Within the Department of Transportation (DOT), work order management and supporting call center intake processes are being configured within the Datastream architecture to support the inventory and maintenance management of the County's tree inventory within the rights of way of the County's road system. Once this first step is complete, additional elements of the transportation infrastructure will be added to the Datastream architecture once new funding is appropriated.

Due to budget constraints, during the past two years DGS and DOT have redirected to direct maintenance and operational services those resources that would otherwise have been spent to develop its asset inventory and management systems. Given the poor revenue forecasts, this trend will likely continue over the next two-year cycle.

**Public Schools.** In June 2006, MCPS completed a Master Plan for developing and implementing an asset management system. The scope of this system includes:

- an automated system for managing maintenance work involving physical plant assets;
- data collection and labeling of significant physical plant equipment;
- automation of preventative maintenance schedules; and
- life-cycle tracking of significant assets to provide a more detailed basis for capital renewal budgeting.

*Automated system for managing maintenance work.* MCPS has successfully implemented the Maximo Computerized Maintenance Management System (CMMS) as its enterprise solution for asset maintenance work delivery. Over 60,000 requests per year are submitted through a web-interface by school-based personnel. Maximo provides the management tool for reviewing, prioritizing, and scheduling work delivery. A significant process improvement effort was completed. This process improvement effort used a value

stream mapping (VSM) project facilitated by Lockheed Martin through a corporate partnership program. Several work flow improvements that resulted from the Lockheed Martin facilitated VSM project were implemented as part of an upgrade of the Maximo system. Maximo warehouses work history and provides an integrated foundation for additional modules of the overall asset management system.

*Asset data collection and labeling.* An important step in implementing the asset management system is to track each piece of significant equipment. Data acquisition and labeling of the equipment inventory allows the work history, preventative maintenance, and projected need for replacement to be managed through an integrated system. In July 2006, a contractor undertook the effort to collect the name plate data and label each piece of significant equipment. The initial data collection and labeling effort has been completed. Processes have been developed to continue to update the equipment inventory data as equipment is taken out of service or new equipment is added.

*Preventative maintenance automation.* With significant equipment identified in the Maximo equipment tables from the asset data collection and labeling effort, preventive maintenance (PM) schedules can be programmed for each piece of equipment and work orders can be generated as PM is required. A significant portion of mechanical system PM, including filter and belt changes, and lubrication, is the responsibility of the school-based building service personnel. An effort is underway to pilot the PM scheduling features of Maximo so that work orders are forwarded to a school's building service team for completion. The building service manager will then report the completion of PM work orders to the Maximo system for accountability and record keeping purposes. This represents a major threshold of expanding Maximo to an enterprise-wide system by incorporating the Division of School Plant Operations PM efforts. After the pilot is completed, implementation to all schools is planned.

*Life cycle management and replacement.* With significant equipment identified in the Maximo equipment tables, maintenance managers will have database capabilities and access to reports to track lifecycle issues and upcoming replacement needs. In anticipation of the completion of the data collection efforts, a process improvement team has been chartered to review the process for prioritizing mechanical equipment for replacement. Through this effort, a new process for prioritizing mechanical equipment for replacement will be designed by a collaborative team of stakeholders. In addition, this team will incorporate into the process the features and capabilities of the Maximo database, including equipment work order history, age, and other relevant information. Once this effort is completed for mechanical systems, the process can be implemented with other categories of infrastructure.

*Funding needs for additional implementation.* Requests for further implementation of the Master Plan will be included in future budget submissions.

**Montgomery College.** During the summer of 2009, the College upgraded the computerized facilities maintenance management system from Datastream 7i to Infor 8.3. The Datastream product was purchased by Infor a number of years ago. The Datastream 7i version was at the end of its life, and support was discontinued by Infor. The new version, Infor 8.3, is



an upgrade to the existing system - not a new product. The College's computerized maintenance management system, Infor, allows for the automated tracking and sorting of work tickets. These work tickets can be 'demand,' that is requested by a customer, or 'preventive,' that is a scheduled maintenance request based upon either calendar or usage. The maintenance management system allows for tracking labor hours and material costs for every work order. With the Infor system, work can be tracked, measured and managed more efficiently. The system functions well and is user friendly. The next step in the further evolution of this system is to determine if this software can be integrated with the College's deferred maintenance software system and database. The College will be evaluating this issue.

According to the online database prepared by Vanderweil Facility Advisors (VFA) the total deferred maintenance for Montgomery College totals approximately \$78 million. The latest update of the facilities assessment database, and an additional analysis of the progress made through 2009, indicates that at best the College is running in place due to the effects of inflation and the aging of the existing physical plant. Updated information indicates that beginning with the original 2002 assessment data the College's anticipated backlog was \$76.6-million (adjusted to 2009 dollars). Since 2002, \$39.3-million was spent strictly on repairs, replacements, upgrades and other direct maintenance items. An analysis of the 2007 data adjusted for inflation and work accomplished through 2009 shows that the anticipated backlog of deferred maintenance items totals approximately \$78 million. In other words, existing building systems and site improvements continue to reach the end of their useful life at a pace almost equal to the pace at which the systems and improvements are replaced. On this schedule, the deferred maintenance backlog will be only incrementally reduced during the future years.

***M-NCPPC.*** Since the last Report M-NCPPC has been engaged in collecting a complete facility inventory and assessment of major infrastructure in its park system. In FY06, The Department of Parks entered into a multi-year contract with Facility Engineering Associates (FEA), an engineering and consulting firm who specializes in facility condition assessments to assist the Department in verifying the current inventory and conduct a condition assessment of the inventory. Thus far, the contract has resulted in the creation of the criteria for life-cycle replacement of infrastructure on several categories of park facilities. These facilities include playgrounds, park activity buildings, and hard surface trails. Information collected has been used by inspection and maintenance staff to better program activities. And preventive maintenance work orders are being generated to track these facilities.

This information is captured in SmartParks, the Parks Department's computerized maintenance management system (CMMS). SmartParks software provider was sold from Maximus to Assetworks, but remains the same client/server, non-web based package Facility Focus. SmartParks conceptually has undergone several changes in directions over the past years until it has been placed in the newly created Facility Management division within the department. With new leadership, the focus has again been placed on setting up SmartParks as the departments primary source of all Parks related assets, inventory and work orders.

The purpose of the FEA remains the same: to complete a comprehensive inventory of park assets that will aid the Department in evaluating the infrastructure in its Park System by a)

creation of a maintenance program; b) estimating the required funding to maintain the infrastructure and multi-year capital planning and management of resources. In addition, the work product will be used to implement an ongoing process of identification and prioritization for replacement, renovation and maintenance of all infrastructure assets.

To date, FEA has completed Recreation and Ancillary Buildings, Playgrounds, Hard Surface Trails, Entertainment and Sports-Oriented Buildings, and Education and Conference Centers. Based on the condition assessment and life cycle cost analysis done to date by FEA, and under this new direction, the focus on the FEA study has changed to a geographic based collect all assets within a park. Work is in progress for the collection of condition assessment of all assets within the three major regional parks; Little Bennett, Rock Creek, and Wheaton. Each park completed identifies a back log of deferred maintenance and capital renewal, and provides recommended life cycle and on-going maintenance programs. The data collected has been loaded into SmartParks. While the original plan was to load data into the Capital Planning and Assessment Module of Facility Focus, it provide not to be as integrated as expected, requiring excessive staff time to adequately complete the task. Staff is now reassessing the best way to achieve Facility Condition Assessment (FCA) with current software. Reporting and analysis of estimated cost data target park facilities plus the associated systems and equipment to support asset life cycle decisions is still the target. The ability to perform the condition assessment and includes a calculated Facility Condition Index (FCI) for planning and analysis. We also plan to provide the functionality to plan and subsequently perform work to cure deficiencies discovered during the condition assessment.

Steps currently in process include refining the business processes within the Department to more efficiently utilize the existing inventory and work order capabilities of SmartParks. These processes will guide the life-cycle replacement and recurring and preventative maintenance programs for the facility groups captured. The remainder of the facility groups will be captured geographically by maintenance area. It's important to note that once this information is complete and we have a complete picture of the entire park inventory, this information should be updated on a continuous basis.

## **5. Information Technology**

The Interagency Technology Policy and Coordination Committee (ITPCC) produces a regular report highlighting information technology priorities for funding. The next regular report is scheduled for release in the early spring, and the agencies are already compiling its relative priorities, utilizing a 'red'/'yellow'/'green' criticality rating system. To effectively evaluate all infrastructure maintenance and major information technology systems issues at one time, the Infrastructure Maintenance and Information Technology reports should continue to be published on the same cycle.

Information in ITPCC's report will be updated and presented to the Management and Fiscal Policy Committee on April 5.

**Members of the  
Infrastructure Maintenance Task Force**

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